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eye with his fellow-minds. "This," he says, "is the *social idea*. The men of culture are the true apostles of equality. The great men of culture are those who have had a passion for diffusing, for making prevail, for carrying from one end of society to the other, the best knowledge, the best ideas of their time; who have labored to divest knowledge of all that was harsh, uncouth, difficult, abstract, professional, exclusive; to humanize it, to make it efficient outside the clique of the cultivated and learned, yet still remaining the best knowledge and thought of the time." The abstract, the difficult, let us add, science must enter upon; but to labor as we can to divest knowledge of its difficulty, to make it a simpler and thereby a clearer knowledge, is an effort conceived in the spirit of science itself.

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## A METHOD OF DEALING WITH THE LABOR PROBLEM.

The old way of dealing with distress arising out of imperfect social conditions was by the indiscriminate and unorganized distribution of doles, a method perhaps justified in certain social stages. Of new ways, originating from new conditions of life and largely from a more sensitive conscience, there seems to be so many that it is difficult even to enumerate them. The latest development, and it is a very surprising one, is chiefly inspired by commercial considerations and aims to do the utmost for the employé because, so the theory runs, the more the welfare of the worker is studied, the more will the establishment in which he is employed thrive. However, the widely recognized methods of dealing with the social problem are of various kinds and are due to various motives. There is the method of organized charity, as illustrated by the London Charity Organization Society, the *Auskunftsstelle* of the Berlin Ethical Society, and the Paris *Société des Visiteurs*, all aiming not so much to alleviate as to remove distress and all anxious to develop rather than to lower self-respect, as can be seen even in the more or less intentionally ambiguous names of those bodies. A relatively higher and different kind of philanthropy is that of the "good" employer

who provides light, fresh air and comfort in his factory and who goes to the length of building small model towns for his employés. Finally, if we omit those well-doers who endow and support institutions such as hospitals, libraries, and colleges, and if we leave aside those who attempt to remedy, more or less drastically, social evils and inequalities by legislation, we meet everywhere with coöperative organizations where the workers are determined to compass their own economic and moral salvation.

Professor Ernst Abbe's endeavors, in connection with the world-famed optical works in Jena, known as those of Karl Zeiss, of which he was the sole proprietor, belong to none of the above categories. Just because he was almost irresistibly inclined to be charitable, he intensely disliked all forms of charity, whether indiscriminate or organized, whether promoted by the State, by society, or by the individual. Nor was he a decided believer in "the future State" where everything would be ideally settled by the Democracy, though his sympathies with the Social Democrats of Germany were of an unmistakable character. Least of all would he have favored wide-reaching reforms in factories on the ground that the generous treatment of the workers was financially profitable.

Ernst Abbe's efforts demand attention, therefore, if only because of the new point of view from which he approached social reform. Not profit, not charity, not coöperation, not doctrinaire legislation, but justice, was his leading thought, and if we wish to penetrate into the inner meaning of the Karl Zeiss *Stiftung* we must carry that thought always with us. What the Regulations contain has the force of law and is independent of what the management may determine apart from the Regulations. Every employé, from highest to lowest, is party to a legal contract, and the final authority, outside the law, rests in a State official whose business, as regards the firm, is solely to see that the Regulations, which are of the most elaborate kind, are loyally adhered to. Furthermore, Abbe's main idea was that similar Regulations should be drawn up and enforced by the State, and that thus a sense and an act of justice should lie at the basis of all industrial relations.

What is the Karl Zeiss *Stiftung* and who was Professor Ernst Abbe? Karl Zeiss came in 1846 to Jena and opened up a small workshop as a mechanician. After a time, stimulated by the needs of the University, he began to manufacture microscopes which, we are told, were no better and no worse than those manufactured by respectable firms. However, Karl Zeiss, plain mechanician as he was, had a luminous idea which he was anxious and determined to see realized; it was nothing less than that microscopes should be constructed on scientific principles and not by rule of thumb, by chance experience. At first he was not successful in finding any one to translate his idea effectively into fact, but his persistency was rewarded at last by meeting with Abbe who was Professor of Theoretical Physics and Astronomy in Jena. Abbe accordingly investigated the problem of the microscope, as Fraunhofer before him had investigated the problem of the telescope, and made a series of brilliant scientific discoveries which resulted ultimately in a revolution in the conception and construction of the microscope. Abbe became partner in the firm in 1875, and under his stimulus the small workshop employing about twenty men became a factory, including here the glass works, employing about two thousand. Karl Zeiss died in 1888, and the firm consisted then of Abbe and the son of Zeiss, Dr. Roderich Zeiss. The year after, in 1889, Abbe made an arrangement with his partner and became sole proprietor. This was but a prelude to a very significant step which had been planned by him as early as 1886. Abbe was concerned that his death should not mean the death of the Regulations which he had carefully elaborated, and so he decided to turn the enterprise into an impersonal *Stiftung* becoming an employé in his own works. Instead of drawing an annual income of over a million marks, he, having deprived himself of his fortune, was prepared to accept 13,000 marks a year as one of the members of the Board of Management. This act by itself brings out vividly the profound ethical convictions which animated Abbe. For the last few years of his life, then,—he died all too early, on January 14th, of last year, at the age of sixty-five,—he was one of the Board of Managers under the *Stiftung*.

That Abbe was a very remarkable man, indeed, will now be evident. Still, to understand the Regulations of which an account is to be given in this article, we must know more about their originator. The founder of the *Stiftung* was the son of a foreman in a spinning mill at Eisenach. In the Common School Ernst proved to be so exceptional a scholar that at the age of ten his teachers pressed the father to send him to a *Real-gymnasium*. Ernst went accordingly to the High School and at the age of seventeen entered the University of Jena where he studied for two years. A prize offered by the faculty for the solution of some physical problem was not only won by him, but brought high praise. With great difficulty Abbe managed to pay his way, and, at last, at the age of twenty-one, he took his doctorate—a *summa*—at Göttingen. At twenty-three he was warmly welcomed at Jena as a *Privat Docent*, with a small salary, and afterwards he occupied with distinction a professional chair and became the Director of the Observatory.

His being the son of a workingman explains probably Abbe's abhorrence of charity and his demand for justice in the industrial relations, as well as his sympathy with the Social Democrats and his dislike of the dogmas of the Churches. That fact, too, helps to make clear the keen insight he displayed in the chief grievances of the working classes, an insight which is possibly unsurpassed. Yet, as we shall see, Professor Abbe had also a deep respect for the advancement of learning and the development of what was best in the picturesquely situated little town of Jena where the works happened to be.

To come to the Regulations. Abbe considered that the individuality of employes should be held sacred—a point of view which, according to him, flatly contradicts the German practice of to-day. A man's politics, a man's religion, or a man's descent, must form no ground of acceptance or rejection, and absolute impartiality in these matters is insisted on in the Regulations. Seeing, too, that everybody ought to be free to serve his community and his country, provision is made that, irrespective of the color or shade of opinion, every employé who is elected as a local or national representative shall continue to re-

ceive his salary or wages during the time of necessary absence from his works. Leave must also be granted on a reasonable cause being given (including military service and imprisonment up to six months); the working of overtime is optional; and, generally speaking, the freedom of the individual outside the factory is guaranteed. The employés, too, may elect committees, hold meetings, and their representatives must be heard by the Board of Management. In other words, a man no longer sells his opinions and his life with his labor power.

The hours of work at Karl Zeiss were reduced, after a period of trial, from nine to eight. The worker, therefore, has reasonable leisure in which to live a life apart from his profession, and he is not overfatigued through too many hours of strenuous effort. Overtime, as mentioned above, is optional; the ordinary holy days, about eleven in number, count as working days, and a right exists of a fortnight's holiday of which one week is paid by the firm.

The wage problem is dealt with in the following manner. Every worker receives a fixed weekly wage. Piece work is the rule in the factory, but is not compulsory; and a piece worker may earn more than the fixed wage, but cannot earn less. Should work be slack, the wages remain unaltered, though a certain fixed amount of unpaid overtime may be demanded when the slackness passes. Wages begin with sixteen marks for those who are new-comers and unskilled; the average wage of those who are over twenty-four years of age and who have been in the firm for three years, including the deferred annual wages, is at present thirty-four marks, which, considering the general provisions, is a far higher wage than is obtained in other optical works. A certain percentage above a certain fixed profit is distributed annually as deferred payment, not as a share in profits. This uncertain factor is, in a sense, contrary to the general spirit of the Regulations, and was only agreed to so as to allow for a fixed minimum wage. The average for some years was an addition of about nine per cent. to the fixed wages, though in 1902 there was no addition at all. In the past year—1905—it is understood, there was a large surplus. Another item is also of considerable interest. Professor Abbe

did not believe that the disparity in incomes should be unlimited, and so the Regulations fix the maximum salary at ten times the average wage of the workers, and provision is also made that the total income of those who receive salaries should not exceed a certain proportion of the total annual wages. To secure impartiality, it is also declared that the members of the Board of Management can receive no annual or other addition to their salaries, except such as is due to inventions made by them.

What shall become of the aged or invalided worker? Professor Abbe held that a firm must in justice allow for depreciation in workers as for depreciation in materials. Accordingly, a far-reaching pension scheme exists which embraces the worker, his wife, his children, and any other dependent. There is a minimum which may be claimed after five years' service when some accident or illness disables the worker. The maximum after five, ten and fifteen years, respectively, is 100, 120 and 140 marks, and the maximum received after thirty years' service and the attainment of sixty-five years of age, consists of seventy-five per cent. of the wages. Four-fifths of the invalid pensions may be allowed to the dependents of the deceased. Every precaution is taken that the spirit of the Regulations on this point should not be evaded; *e. g.*, the basis of the pension is the highest fixed wage received.

The problem of the unemployed, which is perhaps the most difficult one to solve of all modern industrial problems, is thus attacked. Professor Abbe felt that, on the one hand, everything possible should be done to discourage the unnecessary dismissal of men, and, on the other hand, that dismissal was unjust to the men since it implied that the worker had to suffer because no provision was made by a firm against slack times. Accordingly, no one who has been three years in the service of the *Stiftung* can be dismissed unless he receives a sum of money equal to a full six months' wages as compensation. That has produced the desired result—security of employment is almost absolute, and the temptation to take on or to dismiss men lightly is at a minimum. When, a short time ago, a number of wage-earners were dismissed, the firm paid them 30,000 marks as compensation.

Needless to say, the Regulations are generous in the case of illness, the firm paying into the sick fund, which is managed by the workers, about as much as the total amount of the workers' contributions; and a sum equal to three-fourths of the wages is given as sick pay for six months. There is also a Savings Bank; a Bathing Establishment, which is made use of during working time, is on the premises; and scores of minor arrangements exist which cannot be referred to here for want of space.

So much as to the position of the employés under the Regulations. The business is by no means permitted to develop apart from certain moral considerations. Improvements which affect research or have a scientific value must not be patented; thorough and original work must be encouraged; and mere quantity of production and profit must not be the aim of the Board of Management. In other words, everything is done to moralize business conceptions, and nothing is done to encourage mass production irrespective of social usefulness.

The considerable profits of this flourishing and expanding establishment are distributed in accordance with the Regulations. Precisely as the idea of justice inspires the prescribed relations of the employés to the *Stiftung* and as the idea of the common good determines the class and the quality of the optical work to be undertaken, so the notion of justice presides over the distribution of a certain percentage of the profit. Wealth, according to Abbe, is a social product, and an establishment such as that of Karl Zeiss owes much to scientific research. In accordance with this the University of Jena receives, as a kind of repayment, a considerable share of the surplus, on the condition that the freedom of teaching and opinion is guaranteed. The salaries of professors have thus been raised; a hygienic, a mineralogical, and a physico-technical institute have been built; and a new University building has become possible through a contribution by the firm of 450,000 marks. In competent quarters it is even asserted that but for the generous assistance rendered by the optical works, the University of Jena, belonging as it does to an insignificant principality, would not have been able to maintain its position against the competition of the other German Universities. The University of Jena will not decay as long as the firm of Karl Zeiss is successful in its enterprises.



The Regulations show similar concern for the town in which the works are situated. The new *Volkshaus*, or People's Institute, built at an expenditure of a million marks, is a public building to which it would be difficult to find an equal. It possesses splendid reading rooms which contain all the important European dailies and periodicals. Democratic, liberal and conservative papers and periodicals are to be found, and free thought is there the peer of orthodoxy. So, too, with the magnificent rooms and halls: they are let to all sections of the community, including the boycotted followers of Marx who previously could obtain no meeting-place in Jena. A public library, supported mainly by the firm, is housed in the Public Institute, and is among the best used ones in Germany. The Institute also has a technological museum and a technical school. The firm will soon build commodious baths for Jena. It is unnecessary to mention that Abbe has done many other things for the town which, mainly owing to his enterprise, has grown in fifteen years from 11,000 to 25,000 inhabitants.

Professor Ernst Abbe was a member and a most liberal supporter of the Jena Ethical Society. Though a declared free-thinker and follower of Haeckel, though he renounced the Christian faith, and had committed the offence of placing the Socialists on an absolute equality with their fellows, men of all parties in Jena mourned his death. His ability, his sincerity, his strenuousness, his self-sacrifice, his humility, his broad sympathies and impartiality, impressed every one deeply, and his personal friends, several of whom the present writer had the pleasure of meeting in Jena, could scarcely convey the profound admiration which he roused in them. Abbe was a veritable saint of modern times—ethical and rationalistic to the core, honoring men's individuality and anxious to promote the public welfare.

Professor Abbe was a serious student of English affairs, and it seems, therefore, surprising that the coöperative spirit is almost wholly absent in the Karl Zeiss undertaking. After all, to serve out justice is but a loftier kind of charity and benevolent despotism. According to the coöperative ideal, the Regulations should have been elaborated coöperatively and the em-

ployés should have had some distinct representation on the Board of Management. The most advanced ideal is surely that the workers should feel that they are a vital part of an undertaking and share the responsibilities of the management. The wage earners should not play as they do an almost receptive and passive rôle. In practice, however, certain important deductions have to be made which scarcely justify in full the inferior position of the workers at Karl Zeiss. Professor Abbe argued that the enterprise was of too scientific a character for the workers to be entrusted with a share in the management, and he believed besides that only special talent was equal to such a task. He feared that incompetence would destroy or make void the Regulations. Much may be said in defence of Abbe. It was true when the Regulations were drawn up, and it seems true to-day, that German workingmen are yet in the stage of political rather than of economic action. Abbe had occasion to reproach the Workmen's Committee that they never met unless the Management invited them to do so, and it is likely, under the circumstances, that more democratically conceived Regulations would not have persuaded the workers to take an enthusiastic interest in the Management. Nevertheless, if manufacturers in the United States and in Great Britain should think of modelling their factories on the Abbe Regulations, they ought certainly to allow for a closer identification of the workmen with the enterprise.

One other serious criticism suggests itself. While the motive inspiring the pension scheme is just and the provisions are generous, yet the certainty of the pension depends on the firm being successful in its operations. One would have thought that in so serious a matter the element of chance would have been reduced to its lowest limit by the firm insuring its employés. But this raises the most significant issue, viz.: that the whole of the provisions of the Regulations depend on whether the firm flourishes or not, so that only under some State guarantee could Professor Abbe's method of grappling with industrial problems be satisfactory as a general solution. Nor can one help feeling that too straight a line is drawn between salaried and wage-earning workers.

Dr. Czapski, who was Abbe's private secretary and now on the Board of Management, has in hand the publication of various writings of the founder of the *Stiftung*, and it is to be hoped that while the memory of this remarkable man is yet fresh, we may have a good biography which shall inspire others to seek for a solution of industrial problems along the lines of justice and humanity.\*

GUSTAV SPILLER.

LONDON.

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\* Readers who would make a study of the Karl Zeiss *Stiftung* may be interested to know the literature on the subject. A general account is to be found in "The Zeiss Works and the Karl Zeiss Stiftung in Jena," translated by S. F. Paul and F. J. Cheshire, published in London by Marshall, Brookes & Chalkley, Ltd. A very brief account in sixteen pages is "Abbe Karl Zeiss Stiftung in Jena," by Leopold Katscher, Leipsic, Felix Deitrich, 1905. An economic appreciation is that of Prof. Pierstorff of Jena "Ernst Abbe als Sozialpolitiker;" Jena, Gustav Fischer, 1905. A scientific appreciation is offered by Prof. Winckelmann of Jena, "Ernst Abbe;" Jena, Gustav Fischer, 1905. A personal appreciation is supplied by Friedrich Thieme, "Ernst Abbe, Ein Lebens u. Charakterbild;" Poesz-neck in Thür., Bruno Feigenspan, 1905 (contains portrait); and in the "Gedenkreden und Ansprachen gehalten bei der Trauerfeier für Ernst Abbe" published by the firm. The rules and regulations are contained in the *Statuten*, the *Pensions-Statut* and in the *Arbeitsvertrag*. Of Abbe's own writings we may mention "Ueber die Grundlagen der Lohnregelung in der optischen Werkstätte," "Ueber die Aufgaben des Arbeiter-Ausschusses," "Die volkswirtschaftliche Bedeutung der Verkürzung des industriellen Arbeitstages" (a Report), and "Welche soziale Forderungen soll die Freisinnige Volkspartei in ihr Program aufnehmen?"